A NEW SUBSPECIES OF *EUPLOEA ALCATHOE* (GODART) (LEPIDOPTERA: NYMPHALIDAE) FROM THE NORTHERN TERRITORY, AUSTRALIA

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Abstract

Euploea alcathoe (Godart) is recorded from the Northern Territory, Australia, and described as a new subspecies, *E. a. enastri*. Notes are given on its biology and habitat, with comments on flora and butterflies shared by north-eastern Arnhem Land and Cape York Peninsula.

Introduction

As treated by Ackery and Vane-Wright (1984) the butterfly species *Euploea alcathoe* (Godart [1819]) ranges from the southern Molucca Islands and the Kai and Aru groups through New Guinea eastward to Fergusson Island and southward to north-eastern Australia. These authors followed Corbet (1943) in regarding the taxon *E. eichhorni* Staudinger as a subspecies of *E. alcathoe* rather than a full species. This is not, however, universally accepted by Australian workers (e.g. M. De Baar, pers. comm.). Be that as it may, undisputed *E. alcathoe* is known within Australian limits by the subspecies *monilifera* (Moore), of which the type female came from Thursday Island and a small number of males have subsequently been collected in the Torres Strait Islands and far northern Cape York Peninsula (De Baar, 1988; Lambkin and Knight, 1990).

Abbreviations: ANIC, Australian National Insect Collection, CSIRO, Canberra; BMNH, British Museum (Natural History), London; NTM, Northern Territory Museum, Darwin; QFIC, Queensland Forest Service Insect Collection, Brisbane; QM, Queensland Museum, Brisbane; TLF, author's collection.

Observations

In July, 1988, Mr Geoff Martin collected what proved to be the first known specimen of *E. alcathoe* from the Northern Territory. The insect was one of several individuals seen in a small area of tall groundwater forest behind coastal sand dunes at Rocky Bay (12°16'S 136°54'E) on the Gove Peninsula at the north-eastern extremity of Arnhem Land. The newly discovered insect was easily distinguished in the field from *E. darchia darchia* (Macleay) and *E. sylvester pelor* Doubleday, with which it flew, by its larger size and darker appearance. Unfortunately the specimen, a male, was shattered during transport and only its wings remain in the author's collection. Following a number of subsequent visits to the locality, I have been able to collect good series of both sexes and obtain some information on the insect in life. Its occurrence in two other locations in far north-east Arnhem Land is confirmed by 1 ♀ taken near the head of Port Bradshaw and 8 ♂♂ 2 ♀♀ collected near Mt Bonner.

These localities are respectively some 20 km SW and 40 km WNW of Rocky Bay and likewise bear pockets of groundwater forest, in and around which *E. alcathoe* was collected. Males from Rocky Bay show considerable variation in the number and size of spots on the wings, whereas those from the Mt Bonner area are less variable in these characters.

Males were most commonly found within 3 m above ground level in small glades within the forest or near its boundary with surrounding woodland, resting on twigs or the upper surface of large leaves or making short flapping and gliding flights to and fro. During these flights they investigated other butterflies in the vicinity and interacted particularly with conspecifics, engaging in joint circling flights with other males or a dipping pursuit of females. One was collected feeding at flowers of *Leea rubra* (Leeaceae).

Females were more commonly encountered within 20 m outside the forest edge. They were attracted to paperbark (*Melaleuca* sp.) blossom, presumably as a food source, but more usually fluttered slowly near vegetation, settling frequently and briefly, apparently seeking oviposition sites. At Rocky Bay one was seen apparently ovipositing on young shoots of a creeper projecting from the forest edge about 5 m above ground level. At Mt Bonner, a similar looking plant was collected in woodland surrounding a patch of forest inhabitated by *E. alcathoe*. This has been identified as *Tylophora benthamii* (Asclepiadaceae), and is a possible larval food plant.

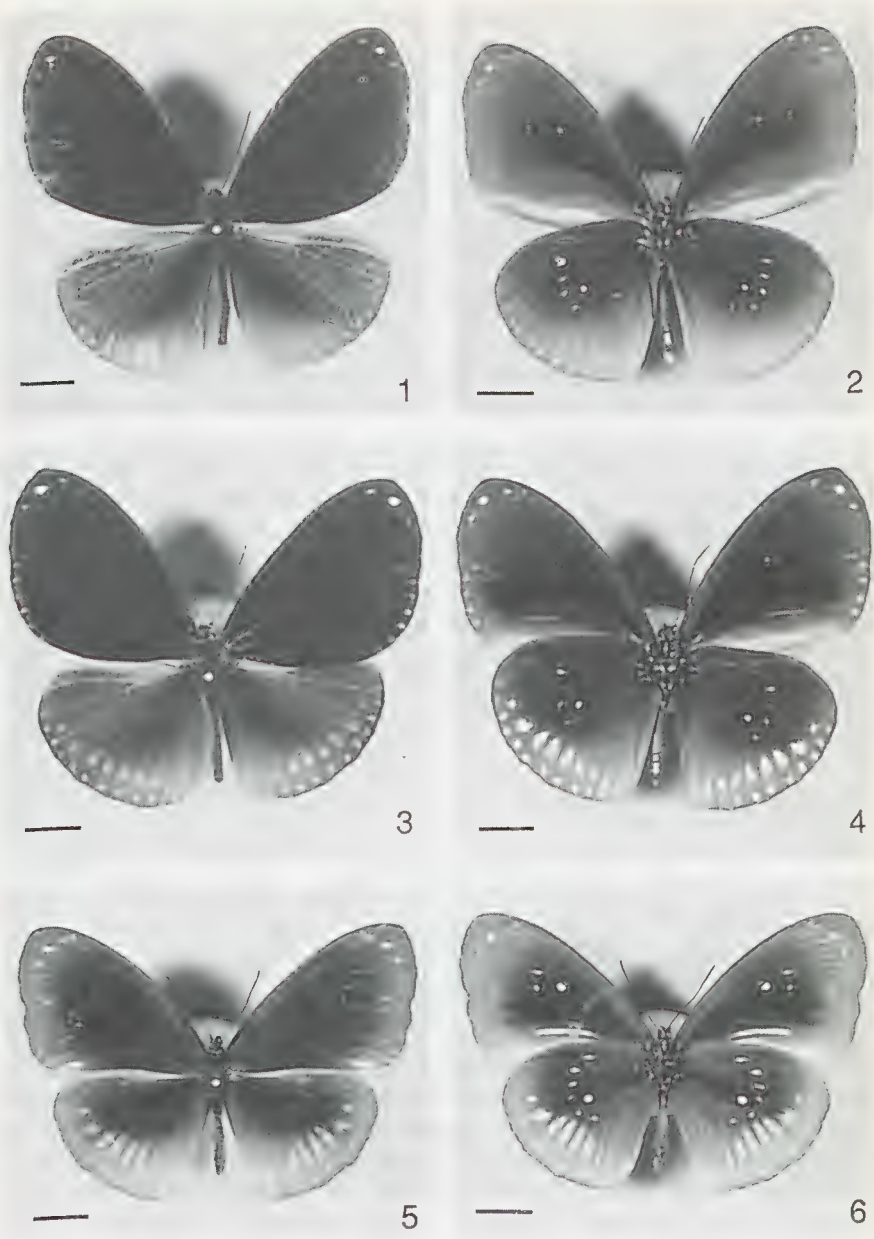
Two pairs were taken *in copula*, in each case resting on the upper surface of a leaf within 3 m of ground level in a sunny situation near the forest edge at mid-morning.

Euploea alcathoe enastri ssp. n.

Figs 1 - 6.

Types - NORTHERN TERRITORY: *holotype* ♂, NE Arnhem Land, Rocky Bay, 15.xii.1988, T. Fenner (ANIC Reg. No. 2495); *paratypes* 23 ♂♂ 5 ♀♀, same locality and collector as holotype, various dates (11.viii.1988, 15.xii.1988, 8.ii.1990) (ANIC, BMNH, NTM, QFIC, QM, TLF); 1♀ same locality 15.xii.1988, S. Collins (ANIC); 8 ♂♂ 1 ♀, NE Arnhem Land, 6km NW Mt Bonner, 25.iv.1990, T. Fenner (ANIC, BMNH, NTM, TLF); 1 ♀, same locality and date, I. Haselgrove (ANIC).

Other specimens examined: NORTHERN TERRITORY: 1 ♂ (wings only), NE Arnhem Land, Rocky Bay, vii.1988, G. Martin (TLF); 1 ♀, Gove Peninsula, Pt. Bradshaw, 16.ii.1989, I. & S. Kilduff (ANIC) with tornal area missing from both hindwings.



Figs 1-6. *Euploea alcathoe enastri*, dorsal (left) ventral (right). 1, 2: holotype male; 3,4: paratype male; 5, 6: paratype female. Scale lines: 10 mm.

Description

MALE: Head, body and appendages black with small patches of white scales on palps, near eyes and on thorax, legs and ventral surface of abdomen. Abdominal hairpencils, which are of the bottle-brush type (Boppré and Vane-Wright 1989), bright orange-yellow in the living insect. Forewing without androconial brands, costa curved, apex rounded, termen, tornus and dorsum forming a continuous curve; velvety black above, in fresh specimens with a dull purplish gloss in angled light, very slightly paler on termen and at tornus; usually with an apical white dot or spot between R_5 and M_1 and sometimes up to 4 such dots between R_3 and M_2; in 12/32 a few subterminal dots between M_3 and tornus, usually obscure; beneath blackish-brown lightening to chocolate brown toward costa, apex and termen, still lighter below CuA_2 with a whitish streak along outer 3/4 of 1A + 2A and the area below that vein satiny greyish fawn; usually up to 4 white apical spots and in 19/32 from 1 to 5 white subterminal dots; a white dot at base of cell and a larger one edged bluish near its apex; usually 1 to 3 similarly coloured spots or short streaks in discal area immediately beyond cell between M_1 and CuA_1 and occasionally another between R_1 and R_2; usually at least a trace of a short, pale streak between CuA_2 and 1A + 2A, but this is rarely pronounced. Hindwing rounded, above blackish-brown lightening to mid-brown toward termen below M_3, this colour extending across tornal area to outer $^1/_3$ of dorsum; cell, part of area between M_3 and CuA_1 and most of that between R_S and M_3 comprising elongate dull dark brown androconial scales as does the posterior part of the outer 2/3 of the space between S_C + R_1 and R_S; remainder of anterior portion of wing satiny greyish-fawn; an outer subterminal series of 1 to 13 pale dots, often obscure, between R_S and tornus and usually an inner series of up to 9 similar but larger obscure, sometimes elongate spots in the same spaces. Ground colour beneath similar to that above, 4 white dots near base, a bluish-white spot near apex of cell and 1 to 5 similarly coloured spots in discal area immediately beyond it between R_S and CuA_2; an outer series of 1 to 13 subterminal white dots and usually an inner series of up to 9, often larger and sometimes elongate, spots. A few specimens, lacking forewing apical spots on both surfaces and subterminal spotting on both wings, are indistinguishable from ssp. *monilifera* (Moore). In one specimen the lighter area of hindwing above is conspicuously paler brown than usual, and on ventral surface of forewing there is an additional small spot in the distal part of the cell. One specimen has, in addition to 4 apical white spots of forewing beneath, 3 dots still closer to the margin between R_5 and M_2. Forewing length 41 - 46 mm.

FEMALE: Head and body colouring as in male. Forewing termen slightly concave, tornus distinct and dorsum straight; blackish-brown above, outer 1/5 paler; 4 white apical spots between R_3 and M_2, sometimes obscure, that

between R_5 and M_1 largest; in 4/8 a white dot between R_1 and R_2 near apex of cell; usually a few obscure subterminal spots; in 3/8 a short, pale streak on dorsum near tornus; beneath blackish-brown, costal area and outer $^1/_4$ distinctly paler, near dorsum bluish-grey; 4 white apical spots, usually 2 - 4 white subterminal dots with another 1 or 2 slightly further from termen between M_3 and CuA_2; a dot at base of cell and a lavender spot near its apex; 2 - 4 discal spots of similar colour and in 5/8 another with white centre between R_1 and R_2; a long, narrow lavender streak between CuA_2 and 1A + 2A. Hindwing rounded, blackish-brown above, broadly paler toward margins; 1 or 2 pale dots in space between S_C + R_1 and R_S; a subterminal series of 2-11 pale dots, often obscure, between R_S and tornus and an inner series of 4-11 larger, sometimes elongate spots in same area, also often obscure; indications of a discal spot near cell between R_S and M_1. Ground colour beneath dark brown, broadly paler toward termen, tornus and dorsum; 4 white dots near base; a lavender spot near apex of cell and 6 discal spots of similar colour immediately beyond it between S_C + R_1 and CuA_2, that nearest the costa sometimes minute; an outer subterminal series of 5-12 white dots and an inner series of 1-11 larger white spots, sometimes elongate. One specimen has a discal white dot between M_3 and CuA_1 on forewing above. Forewing length 41-46 mm.

The subspecific name is the feminine form of a modern Greek adjective meaning 'starry' and alluding to the ventral wing pattern of scattered small white spots on a very dark background.

Recognition

The new subspecies is distinguished by the submarginal spots on the dorsal surface of the hindwing being either very small or only obscurely indicated. In addition, 25/32 males and 8/8 females have from 1 to 4 smallish but sharp white dorsal spots at the apex of the forewing, and while these may be variously shaped none are indented at the distal end (as are the largest of those of *E. a. nox* Butler). The forewing ventral streak between CuA_2 and 1A + 2A of males is short and narrow, and is absent in 8/32 specimens.

The new subspecies most closely resembles *E. a. nox* of the Aru Islands, of which some males have the hindwing dorsal submarginal spots somewhat obscure, but in such examples the forewing dorsal apical spots are also obscure which is not the case in *E. a. enastri*. The majority of Aru specimens have distinct white submarginal spots on the dorsal surface of the hindwing.

I have only seen the female type of *E. a. nymphas* Fruhstorfer from the Kai Islands. This is not dissimilar to the type female of *E. a. monilifera* (also examined), which is illustrated in Waterhouse and Lyell (1914, fig. 22). Both are more profusely white spotted, particularly on the dorsal surface, than is the case in *E. a. enastri*. Males of subspecies *monilifera*

are "remarkably uniform" (De Baar 1988) and are as illustrated in Waterhouse and Lyell (1914, Fig 14) and Lambkin and Knight (1990). A male from Thursday Island mentioned by the former authors as having forewing subapical dots well developed on both surfaces is *E. modesta* Butler (De Baar, 1988), while the male illustrated in Common and Waterhouse (1981) is *E. a. macgregori* Kirby from the D'Entrecasteaux Islands (M. De Baar, pers. comm.). Dark males like those of *E. a. monilifera* are also typical of the subspecies *monaeses* Fruhstorfer from south-west New Guinea and occur occasionally in the subspecies *nox* and *enastri*. Males of the forms from the Moluccas and most of those from the main island of New Guinea have the forewing ventral streak between CuA_2 and 1A + 2A longer and broader than in *monaeses, nox, enastri* and *monilifera*. Lambkin and Knight (1990) incorrectly attribute to me that the subspecies *monilifera* has been taken in the Northern Territory. I consider that all known Territory specimens of *E. alcathoe* should be treated as *enastri*.

Discussion

E. alcathoe is one of several species which, within Australia, are only or mainly found in north-eastern Arnhem Land in addition to their eastern coastal range. A number of woody plants which occur in Queensland are predominantly or exclusively found within the Northern Territory in that area. They include *Arenga australasica* (Arecaceae) (Jones, 1984), *Calophyllum inophyllum* (Clusiaceae), *Dillenia alata* (Dilleniaceae), *Semecarpus australiensis* (Anacardiaceae) and *Syzygium fibrosum* (Myrtaceae) (Brock, 1988). At least 2 butterfly species show similar distribution patterns. *Papilio aegeus aegeus* Donovan (Papilionidae) has been recorded from Groote Eylandt (Common and Waterhouse, 1981) but does not appear to be established there. A wild population exists on uninhabited Marchinbar Island (11°15'S 136°38'E), Wessel Islands, where it breeds on *Micromelum minutum* (Rutaceae) (author's observations: voucher specimens in ANIC and NTM). The north-western Australian citrus butterfly *P. canopus canopus* Westwood also occurs there. *Yoma sabina parva* (Butler) (Nymphalidae), despite older specimens with Darwin as their stated locality (e.g. Waterhouse and Lyell, 1914), has not been collected in recent years further west than Howard Island, north-east Arnhem Land. It is not uncommon in monsoon and groundwater forest pockets of the Gove Peninsula.

Climate may help to explain these observed distributions. The prevailing south-east winds of the May to October period, which bring dry conditions to the rest of the Top End, produce cooler and more humid conditions in north-eastern Arnhem Land by carrying moist air from the Gulf of Carpentaria over that region. From April to October, maximum temperatures on the Gove Peninsula are on average more than 2°C lower

than in Darwin. The milder climate may allow the persistence there of species unsuited to the severe and prolonged dry season experienced in most of the monsoon tropics of the Northern Territory.

Acknowledgments

The subspecies described here was brought to my attention by Mr G. Martin of Palmerston. Mr M. De Baar, Queensland Forest Service, provided much valuable information and literature, and additional references were supplied by Mr E.D. Edwards, CSIRO, Canberra, and Dr G.B. Monteith, Queensland Museum. My parents contributed to the cost of travel to London, where Messrs R.I. Vane-Wright and P.R. Ackery, Natural History Museum, kindly allowed me to examine specimens in their care. Mr T. Lambkin, Queensland Department of Primary Industries, generously loaned specimens for study. Mr C.R. Dunlop, Conservation Commission of the Northern Territory, identified botanical specimens and Mr D. Hodge, Darwin, advised me on the etymology of the subspecific name. Messrs De Baar, Dunlop, Edwards and E.S.C. Smith kindly commented on an earlier draft of this paper. I am grateful to them all.
Fieldwork was carried out in the course of quarantine surveillance of northern Australia, an activity funded by the Commonwealth Department of Primary Industries and Energy and implemented in the Northern Territory by the Department of Primary Industry and Fisheries with the co-operation of communities including the Yirrkala people on whose land the type locality lies.

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